



**International  
Standard**

**ISO 4678**

**Ships and marine technology —  
Noise measurement method for  
HVAC system in accommodation  
spaces**

*Navires et technologie maritime — Méthode pour le mesurage du  
bruit du système CVCA dans les locaux*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Ship design*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Heating, ventilation and air conditioning (HVAC) is one of the most serious noise sources, especially for ship accommodation spaces that are far from the machinery spaces. This noise source affects the habitability comfort of crews and passengers on a ship. Although some standards exist for measuring noise on board vessels, for example ISO 2923, no special attention has been paid to measure noise arising from the HVAC. Other standards such as ISO 3740 are more accurate for quantifying measurement of a noise source. However, the methods specified in other standards require more measurement instruments, are more time-consuming than the method presented in this document and are difficult to use in the noise measurement of HVAC system onboard ships, which has many outlets distributed in hundreds of cabins.

This document specifies a method of noise measurement of HVAC systems in ship accommodation spaces by placing three microphones around the vent outlets to reduce airflow interference and space inhomogeneity, and by correcting the noise result by measuring the reverberation time of the cabin. The noise measurement method for the HVAC system is a compromise, which is more precise, but less laborious, compared to the previous methods.

The measurement should be performed for ship accommodation spaces, where noise exceeds the required limits according to existing regulations. The measurement and analysis results could be used to detect the causes of the higher noise level of the HVAC system, further enabling objective measures to be taken to mitigate these causes.



# Ships and marine technology — Noise measurement method for HVAC system in accommodation spaces

## 1 Scope

This document provides the instrumentation requirements and measurement procedures for measuring noise from HVAC systems in ship accommodation spaces.

Accommodation spaces are defined according to ISO 2923, and include cabins, offices (for carrying out ship's business), hospitals, messrooms and recreation rooms.

Measurement of noise levels in HVAC systems in ship accommodation is performed in the third octave band over the frequency range from 63 Hz to 8 kHz, taking into account the correction of cabin reverberation.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 266, *Acoustics — Preferred frequencies*

ISO 3382-2, *Acoustics — Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms*

IEC 60942, *Electroacoustics — Sound calibrators*

IEC 61260-1, *Electroacoustics — Octave-band and fractional-octave-band filters — Part 1: Specifications*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **nose cone**

microphone shield designed to substitute the normal protection grid of the microphone and used in high-velocity air flows with low turbulence and little swirl having a streamlined shape with the least possible resistance to airflow and a fine wire mesh around its periphery allowing sound pressure transmission to the microphone diaphragm, whilst a truncated cone behind the mesh reduces the air volume in the form of the diaphragm

Note 1 to entry: See [Figure 1](#).